UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,585	01/04/2002	Hongyi Hubert Chen	MP0447	2202

28285 7590 03/23/2005

KATTEN MUCHIN ZAVIS ROSENMAN (MARVELL)
IP DOCKET
1025 THOMAS JEFFERSON STREET, N.W.
SUITE 700, EAST LOBBY
WASHINGTON, DC 20007-5201

EXAMINER	
ABRAHAM, ESAW T	

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/039,585	CHEN, HONGYI HUBERT	
	Examiner	Art Unit	
	Esaw T Abraham	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *8-12,14,16,18 and 67-76* is/are allowed.

6)☒ Claim(s) *1, 4-7, 13, 15, 17, 19-66 and 77-80* is/are rejected.

7)☒ Claim(s) *2 and 3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 April 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to the applicant's amendments

Applicant's arguments, see remark pages 25-33 filed on 11/12/04 with respect to the rejection(s) of claim(s) 1-18 under U.S.C. 103(a) as being unpatentable over Morsberger (U.S. PN: 6,560,746) alone have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as being unpatentable over Morsberger (U.S. PN: 6,560,746) in view of Derby (U.S. PN: 6,519,738).

DETAILED ACTION

1. Claims **1-18** remained pending.

New claims **19-80** are presented for examination.

Claim objections

2. Claims 19 and 31 are objected to because of the following informalities:

Please change the phrase "is configured select a subset" to "is configured to select a subset" (see claim 19, line 4).

Please change the phrase "is configured select a subset" to "is configured to select a subset" (see claim 31, line 4).

Claim Rejections - 35 USC § 101, Non Statutory

3. Claims **43-60, 65, 66, and 77-80** are rejected under 35 U.S.C. 101 because the claimed invention is directed to **non-statutory** subject matter because: the claimed invention is directed to non-statutory subject matter.

As per claim 43:

The claimed invention **(as in claim 43)** is directed to algorithm not embedded in computer readable medium For example, generating a CRC codes comprising the steps of storing a first signal N times, logically combining each stored first signal with one of an input signal and a selected signal M times, selecting a subset of the N storing steps in response to the first selection signal wherein each storing step of the subset of the N storing steps corresponds to a term of a pre-selected CRC polynomial and selecting an output one storing step of the subset of N storing steps corresponding to a length of the pre-selected CRC polynomial keyword in response to a second selection signal are only directed to mathematical algorithms rather than limited to practical applications.

Claims **44-51 and 65,** which are directly or indirectly dependent of claim 43 are also rejected under 101 non-statutory.

As per claim 52:

The claimed invention **(as in claim 52)** is directed to algorithm not embedded in computer readable medium For example, a computer program performing the steps of controlling storing of a first signal N times, logically combining each stored first signal with an input signal and a selected signal M times [emphasis added] are only directed to mathematical algorithms rather than limited to practical applications.

Claims **53-60 and 66,** which are directly or indirectly dependent of claim 52 are also rejected under 101 non-statutory.

As per claim 77:

The claimed invention **(as in claim 77)** is directed to algorithm not embedded in computer readable medium For example, a method of generating CRC codes comprising the

steps of shifting a first signal N times, exclusive oring each shifted first signal selecting one of an output of a corresponding one of M exclusive or'ing steps and an output of a corresponding one of N storing steps wherein an input of an nth one of the N shifting steps is in communication with an output of an n-1th one of the N selecting steps of step (c) etc...[emphasis added] are only directed to mathematical algorithms rather than limited to practical applications. Furthermore, the claim is non-statutory since all of the steps in the claim can be carried out by an abstract computer system or by hand and has no clear relationship to any tangible object.

Claim **78** which are directly or indirectly dependent of claim 77 is also rejected under 101 non-statutory.

The claimed invention **(as in claim 79)** is directed to algorithm not embedded in computer readable medium For example, a computer program performing the steps of controlling shifting of a first signal N times, exclusively oring each shifted first signal with an input signal and a selected signal M times, providing a first selection signal to select an output of a corresponding the M exclusive oring steps and output corresponding the N storing steps, etc.... [Emphasis added] are only directed to mathematical algorithms rather than limited to practical applications. Furthermore, the claim is non-statutory since all of the steps in the claim can be carried out by an abstract computer system or by hand and has no clear relationship to any tangible object.

Claim 80 which are directly or indirectly dependent of claim 79 is also rejected under 101 non-statutory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims **1, 4-7, 13, 15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Morsberger (U.S. PN: 6,560,746) in view of Derby (U.S. PN: 6,519,738).

As per claims **1, 13, 15 and 17,** Morsberger teaches or disclosed a CRC generation circuit and a method of CRC generation comprising an input/output register means, a number of XOR gates and a coupling means (CM) that feeds predetermined ones of the output lines of the output register means and output lines of the input register means as inputs to the respective XOR gates and further a matrix representation of the state change based on the selected CRC polynomial is set up and evaluated (see abstract). Further, Morsberger in figure 1 teaches a serial CRC generation circuit realized on the basis of the CRC polynomial in equation (1a) comprises a number N of shift registers in series connection, a number N of XOR gates (logic gates) whereby

a bit stream SI is input serially to the XOR gate, depending on the selection of N and equation (1a). The XOR gates (logic gates) are provided between each two shift registers and depending on the feedbacks from the XOR gate to the individual shift registers (flip-flops), a desired CRC code is output from the shift register of the final stage (see col. 1, lines 7-20). Furthermore, Morsberger in figure (1c) teaches a general configuration for a parallel CRC generation circuit whereby the parallel generation circuit generates a CRC code of length N defined by the respective CRC polynomial according to the said equation (1a). Morsberger **does not explicitly teach** programming subset of XOR (logic gates) to have a value zero. **However,** Derby in an analogous art teaches a method, and a system for computing a cyclic redundancy code of a communication data stream taking a number of bits M at a time to achieve a throughput equaling M times that of a bit-at-a-time CRC computation operating at a same circuit clock speed (see abstract). Derby further teaches a programmable CRC computation technique is one for which the generator polynomial can set by dynamic configuration or programming and the basic bit-at-a-time CRC computation in FIG. 1 can be modified to be programmable and furthermore a technique being disclosed achieves speed-up even with the fully generic structures in FIGS. 4 and 5 and the coefficients in these structures (in FIG. 4 and in FIG. 5) can be configured dynamically, so long as they have been precomputed off-line and stored for all the generator Polynomials of interest and in GF (2), each coefficient are either 0 or 1, so that the programmable gain elements can be implemented simply (see col. 19, lines 3-27). **Therefore,** it would have been obvious to a person having an ordinary skill in the art at the time the invention was made to implement the system (CRC generation circuit) of Morsberger employing a programmable techniques or dynamic configuration for the CRC generator as taught by Derby.

This modification would have been obvious because a person having ordinary skill in the art would have been motivated to do so because configuring or programming the CRC generator dynamically improves the efficiency of the CRC generation circuit and reduces the CRC computation time.

As per claims **4-6,** Morsberger in view of Derby teach all the subject matter claimed in claim 1 including Morsberger in figure (1b) teaches a serial CRC circuit comprising selection of coefficients in a CRC polynomial reflected in the circuit configuration by the feedbacks from the shift register C.sub.12 to the other shift registers C.sub.0 -C.sub.11 via the XOR gates between the individual shift register C (see col. 2, lines 15-21). Morsberger in view of Derby **do not explicitly teach** or silent to disclose a set of multiplexers for selecting inputs for shifting data to the next shift register. However, this feature is deemed to be known in the art or inherent for CRC generators. **Therefore,** it would have been obvious to a person having an ordinary skill in the art at the time the invention was made to include set of multiplexers for selecting inputs. **This modification** would have been obvious because a person having ordinary skill in the art would have been motivated to do so because providing multiplexers within the CRC generators for selecting inputs for shifting data are well known features of CRC generators.

As per claim 7, Morsberger in view of Derby teach all the subject matter claimed in claim 1 including Morsberger in figure (1a) shows the principle of a serial CRC generation circuit realized on the basis of the CRC polynomial in equation (1a) and further the CRC generation circuit comprises a number N of shift registers in series connection (see col. 1, lines 45-49).

Allowable subject matter

5. Claims **2 and 3,** are objected to as being dependent upon a rejected base claim but would be allowable if rewritten independent from including all of the limitation of the base claim and any intervening claims.

The claimed invention comprises the step of programming comprises programming a first set of selection inputs, wherein the step of programming the first set of selection inputs is based on the pre-selected polynomial key word, the first set of selection inputs is associated with selecting corresponding input from each of the logic gates and a shift logic that is associated with the plurality of registers (as in claim 2) which the prior art do not teach or render obvious.

The claimed invention comprises the step of programming comprises programming a second set of selection inputs, wherein the second set of selection inputs is associated with selecting corresponding input to each of the logic gates, the second set of selection inputs is associated with the selecting a final output from among output from the plurality of registers and the step of programming the second set of selection inputs is based on the pre-selected polynomial key word (as in claim 3) which the prior art do not teach or render obvious.

6. Claims **19 and 31** would be allowable if rewritten to overcome the objection of the claims (see claim objections of claims 19 and 31 in the above), set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims **20-30, 32-42 and 61-64,** which are also dependents of claims 19 and 31 would be allowable if the independent claims 19 and 31 are rewritten or amended to overcome the objection, set forth in this Office action.

Claims **43, 52 and** 77, would be allowable if rewritten to overcome the **35** USC § 101, Non Statutory rejection set forth in this Office action.

Claims **44-51, 53-60, 65, 66 and 77-80,** which are also dependents of claims 19 and 31 would be allowable if the independent claims 43, 52 and 77 are rewritten or amended to overcome 101 non-statutory rejection, set forth in this Office action.

Examiner's statement for reason for allowance

The following is an examiner's statement for allowance:

7. Claims **8-12, 14, 16, 18 and 67-76** have been allowed.

As per claims **8, 14, 16 and 18,** the prior art, Morsberger (U.S. PN: 6,560,746) of record teach a CRC generation circuit and a method of CRC generation comprising an input/output register means, a number of XOR gates and a coupling means (CM) that feeds predetermined ones of the output lines of the output register means and output lines of the input register means as inputs to the respective XOR gates and further a matrix representation of the state change based on the selected CRC polynomial is set up and evaluated (see abstract). Further, Morsberger in figure 1 teaches a serial CRC generation circuit realized on the basis of the CRC polynomial in equation (1a) comprises a number N of shift registers in series connection, a number N of XOR gates (logic gates) whereby a bit stream SI is input serially to the XOR gate, depending on the selection of N and equation (1a). The XOR gates (logic gates) are provided between each two shift registers and depending on the feedbacks from the XOR gate to the individual shift registers (flip-flops), a desired CRC code is output from the shift register of the final stage (see col. 1, lines 7-20). However, the prior art (Morsberger) taken singly or in combination fail to teach,

anticipate, suggest, or render obvious the CRC generation steps of selecting corresponding input from each of the one or more logic gates, a shift logic that is associated with the plurality of registers and programming a second set of selection inputs wherein the second set of selection inputs is associated with selecting corresponding input to each logic gate, the second set of selection input is associated with selecting a final output from among output from the plurality of registers and the step of programming the second set of selections input is based on the pre-selected polynomial that is associated with the CRC generator. Consequently, claim 8 is allowed over the prior art.

Claims **9-12**, which is/are directly or indirectly dependent of claim 8 are also allowable over the prior art of record.

As per claim **67,** the prior art, Morsberger (U.S. PN: 6,560,746) of record teach a CRC generation circuit and a method of CRC generation comprising an input/output register means, a number of XOR gates and a coupling means (CM) that feeds predetermined ones of the output lines of the output register means and output lines of the input register means as inputs to the respective XOR gates and further a matrix representation of the state change based on the selected CRC polynomial is set up and evaluated (see abstract). Further, Morsberger in figure 1 teaches a serial CRC generation circuit realized on the basis of the CRC polynomial in equation (1a) comprises a number N of shift registers in series connection, a number N of XOR gates (logic gates) whereby a bit stream SI is input serially to the XOR gate, depending on the selection of N and equation (1a). The XOR gates (logic gates) are provided between each two shift registers and depending on the feedbacks from the XOR gate to the individual shift registers (flip-flops), a desired CRC code is output from the shift register of the final stage (see col. 1,

lines 7-20). However, the prior art (Morsberger) taken singly or in combination fail to teach, anticipate, suggest, or render obvious a first selector circuit in communication with an output of the storage element and an output of the logic circuit wherein an input of a storage element of an nth of the N CRC sub-circuits is in communication with an output of a first selector circuit of an n-1th of one of the N CRC sub-circuits wherein a first selection signal is configured to select a subset of the N CRC sub-circuits and wherein each storage element of the subset of the N CRC sub-circuits correspond to a term of a pre-selected CRC polynomial keyword, M selector sub-circuits wherein each of the M selector sub-circuits comprise a second selector circuit [emphasis added]. Consequently, claim 67 is allowed over the prior art.

Claims **68-71,** which is/are directly or indirectly dependent of claim 67 are also allowable over the prior art of record.

As per claim **72,** the prior art, Morsberger (U.S. PN: 6,560,746) of record teach a CRC generation circuit and a method of CRC generation comprising an input/output register means, a number of XOR gates and a coupling means (CM) that feeds predetermined ones of the output lines of the output register means and output lines of the input register means as inputs to the respective XOR gates and further a matrix representation of the state change based on the selected CRC polynomial is set up and evaluated (see abstract). Further, Morsberger in figure 1 teaches a serial CRC generation circuit realized on the basis of the CRC polynomial in equation (1a) comprises a number N of shift registers in series connection, a number N of XOR gates (logic gates) whereby a bit stream SI is input serially to the XOR gate, depending on the selection of N and equation (1a). The XOR gates (logic gates) are provided between each two shift registers and depending on the feedbacks from the XOR gate to the individual shift registers

(flip-flops), a desired CRC code is output from the shift register of the final stage (see col. 1, lines 7-20). However, the prior art (Morsberger) taken singly or in combination fail to teach, anticipate, suggest, or render obvious a first means for signal selecting in communication with an output of the data storing means and an output of the logic circuit means, wherein an input of a data storing mans of an nth one of the N CRC sub-circuit means is in communication with an output of a first signal selecting means of an n-1th on of the N CRC sub-circuit means, wherein a fist selection signal is configured to select a subset of the N CRC sub-circuit means corresponding to a term of a pre-seocted CRC polynomial keyword, M selector sub-circuit mans wherein M selector sub-circuit means comprises a second means for signal selecting wherein [emphasis added]. Consequently, claim 72 is allowed over the prior art.

Claims **73-76,** which is/are directly or indirectly dependent of claim 72 are also allowable over the prior art of record.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US PN: 6,754,870 Yoshida et al.

US PN: 5,598,424 Erickson et al.

US PN: 5,724,368 Zook, Christopher

9. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Esaw Abraham whose telephone number is (571) 272-3812. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are successful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Esaw Abraham

Esaw Abraham

Art unit: 2133